Biological Evaluation of a Tent Caterpillar (*Malacosoma* sp.) Infestation in Zion National Park 1968

A form of the Great Basin tent caterpillar has historically plagued Fremont cottonwood, *Populus fremontii*, in and near Zion National Park. Unlike many tent caterpillar populations, the one in the Park has not recently reached extremely low levels between infestation peaks. Population levels are relative and perhaps an endemic level for the Zion population is simply higher than that which we commonly attribute to endemic insect conditions. It is because of this continued occurrence in the Park together with the fact that public use of the Park is highly concentrated that control of the insect has been undertaken for many years. Although control has not prevented a significant population from developing the following year, it has significantly reduced unsightly defoliation and has reduced the nuisance aspect of the larvae. From a tree mortality aspect, it is questionable just how many trees would actually die if the population went uncontrolled. A deciduous host such as Fremont cottonwood has a remarkable propensity to endure defoliation and to refoliate the same season after the cessation of insect feeding. No doubt, certain trees or groups of trees might succumb, but most of the host type would probably survive from year to year.

Essentially, control has accomplished its purpose where foliage was treated. There are, of course, upper crowns and inaccessible trees that are not reached by the mist blower. An exception to control effectiveness is the existence of certain trees which when thoroughly treated still sustain active larval feeding. The reason for this apparent "immunity" is not understood.

In order to determine the 1968 status of *Malacosoma* sp. on Fremont cottonwood downstream from the Park, Forest Service entomologists examined the host type along the Virgin River and its tributary, the Santa Clara River as far as Littlefield, Arizona. Tent caterpillars were found as far as Littlefield and probably extend a considerable distance beyond. It is interesting to note that while the Zion population had mostly pupated by May 16, the insects at Littlefield, Arizona, were well along in the next egg stage.

To assess the potential 1969 infestation in the Park, entomologists and Park personnel applied an egg sampling technique devised for use on aspen in New Mexico but which in recent years has resulted in accurate population estimates in the Park. Egg masses are related to expected defoliation as follows:

Ave. No. New Egg Masses Per Two 30-Inch Branches	Estimated Defoliation
0.1 to 0.7	Light
1.2 to 1.7	Moderate
2.5 or more	Heavy

Zion 68

Samples were taken in most of the areas that have supported most of the recent defoliation. They are referenced as follows:

Area	Location in Park
1	N.P.S. Administration Building
2	Ranger home group (Oak Creek)
3	New campground and amphitheatre at south end of Park
4	"South Campground"
5	Road to Zion Lodge (across from Court of the Patriarchs viewpoint)
6	Road to Zion Lodge (0.1 mile north of Tunnel Road)

The resulting data follow:

Area	No. Trees Sampled	No. Branches Sampled	No. 1968-1969 Overwintering Egg Masses	Ave. No. New Egg Masses Per Two 30-Inch Branches	Expected 1969 Defoliation
1	3	12 (6)	2	0.33	Light*
2	3	12 (6)	0	0	Light*
3	8	32 (16)	2	0.12	Light*
4	20	80 (40)	6	0.15	Light
5	9	36 (18)	0	0	Light*
6	11	44 (22)	12	0.55	Light*
	54	216 (108)	22	Overall Mean=0.20	Light

*Projection of light defoliation is most meaningful for Area 4 and particularly for pooled data inasmuch as a minimum of 20 sample trees is desirable.

The overall mean number of egg masses is down somewhat from last year; 0.31 in 1967-1968 and 0.20 this winter. This difference may be attributable to statistical sampling error. The main conclusion is that the Zion tent caterpillar population next summer is again expected to be relatively light. There will, no doubt, be some locally high insect concentrations.

Zion 68

There is no reason to expect the relatively heavy widespread defoliation reported in past years.

Laboratory rearing of larvae from collected egg masses is not yet complete, but so far we have no reason to expect other than normal emergence next spring. Although an infection of a nuclear polyhedrosis virus was found in 1968 field collections, it is a common occurrence in Malacosoma populations and appears to be highly virulent. It did not appear prevalent enough to significantly reduce the infestation this past season.

Bruce H. Baker

BRUCE H. BAKER, Entomologist